

REMARKS

Claims 1-19 are now present in this application.

Claim 19 has been added and claims 8, 17 and 18 have been amended. Reconsideration of the application, as amended, is respectfully requested.

In the disposition of claims on the first sheet of the Examiner's Office Action, only claims 1-7 are listed. However, claims 8-18 directed to the non-elected method remain in this application. It has previously been requested that the Examiner reconsider and withdrawal this Restriction Requirement. While Applicants reserve the right to file a Divisional application if so desired, at this point, these claims 8-18 are now present in this application. Also, as set forth above, claim 19 has now been added.

Claims 1, 3-4 and 6-7 stand rejected under 35 USC 103 as being unpatentable over CORDOVA et al., U.S. Patent 5,540,504, in view of LEE et al., U.S. Patent 6,071,014. This rejection is respectfully traversed.

Claims 2 and 5 stand rejected under 35 USC 103 as being unpatentable over CORDOVA et al. in view of LEE et al., and further in view of MORI et al., U.S. Patent 6,023,114. This rejection is respectfully traversed.

It should be noted that there are two types of fluid bearings. That is, a hydrostatic bearing and a hydrodynamic bearing. These

are discussed in the specification on lines 18-23 of page 1. The utilized LEE et al. and MORI et al. patents disclose hydrodynamic bearings. When the shaft rotates relative to the bearing, they need grooves, which are located between the shaft and the bearing, to store lubricant for generating hydrodynamic pressure. Hence, the grooves can be located on the bearing as in MORI et al. or on the shaft as in LEE et al. When the fluid bearings are used in the spindle motor, they may be called as "the fixing member" or the "rotating member." However, they generally operate the same. Hence, in the following, the word "bearing" and "shaft" can be considered to correspond to the "fixing member" and the "rotating member."

Turning now to the teachings of LEE et al., grooves are formed on the outer surface as shown in Fig. 5a. These grooves do not penetrate the hub sleeve 162a. This patent combines a liquid hydrodynamic bearing and an aerodynamic bearing as discussed in the abstract of LEE et al.

Turning now to the disclosure of CORDOVA et al., ports 14 are formed on the bushing as shown in Fig. 3. Helical or zig-zag grooves 20 are also provided. While these grooves are in the bushing 70, they do not penetrate through this bushing. Rather, the pinpoint grooves 14 will penetrate the bushing as can better be seen in Fig. 5 of the CORDOVA disclosure. A groove which is a long, narrow furrow or channel, such as 20, is not provided in the

CORDOVA patent, which will penetrate through the bushing. Additionally, the CORDOVA et al. disclosure is a hydrostatic bearing as seen in Fig. 3. This does not produce hydrodynamic pressure between the groove and the shaft where the shaft rotates relative to the bushing.

The present invention, on the other hand, is a hydrodynamic and hydrostatic hybrid bearing. The grooves formed on the inner side of the bearing, such as seen in Fig. 1, for example. The groove 301 can be penetrated through the inner side to the outer side of the bushing 30, as shown in Fig. 5C and discussed on page 6, lines 7-12, for example. The lubricant produces hydrodynamic pressure between the grooves and the shaft when the shaft rotates relative to the bushing.

The Examiner has alleged that it would be obvious to combine the teachings of CORDOVA et al. and LEE et al. However, the CORDOVA et al. patent is only a hydrostatic bearing. The grooves 20 only store lubricant. When the shaft rotates relative to the bushing, the lubricant will not produce hydrodynamic pressure between the grooves and the shaft. There is no teaching or suggestion in the CORDOVA bearing that it could be a hydrodynamic bearing or that the grooves are dynamic pressure generating grooves.

In the Office Action, the Examiner correctly notes that CORDOVA et al. does not disclose the bearing being a hybrid

bearing. LEE et al. is noted for teaching a hybrid bearing. However, this is a hybrid of an air or oil hydrodynamic bearing. There is no teaching for combining a hydrostatic and hydrodynamic bearing. The Examiner jumps to the conclusion that it would be obvious to use a hydrodynamic bearing in the CORDOVA et al. device. However, this is not taught in the prior art. There is no suggestion or motivation for such a modification. While LEE et al. teaches a type of hybrid bearing, this patent does not teach the combination of a hydrodynamic and hydrostatic hybrid bearing. Such a bearing, however, is explicitly called for in independent claim 1 of the present application.

Moreover, as noted above, independent claim 1 calls for grooves which are penetrating through the bushing. The grooves 20 in CORDOVA et al. do not penetrate through the bushing. There are pinpoint ports 14 but these ports which penetrate the bushing themselves are not grooves. Accordingly, this is another reason why the CORDOVA et al. patent would not suggest the claimed bearing.

The dependent claims further define the instant invention from the utilized prior art. For example dependent claim 3 recites a pre-pressure as applied to the housing 4 making the lubricant pass through the grooves and to be present between the bushing and the shaft. Dependent claim 19 further goes on to state that the pre-pressure is applied by an external device after the shaft is in the

bushing. Support for this claim 19 can be found on page 6 of the specification, lines 19 and 20, wherein the shaft is installed in the bushing and then sealed after being pressurized. This is also shown in Figs. 5F and 5G. This pre-pressure is different from any type of pressure increase that would result from insertion of the shaft into the bushing. The pre-pressure is applied after the shaft is in the bushing. Moreover, this claim 19 recites that the pressure is applied by an external device. Again, this arrangement is shown in Fig. 5F of the application, for example. This is different from a shrink-fitting process, which may or may not occur in the CORDOVA et al. patent.

Additionally, it is noted that dependent claim 7 recites two pair of herringbone grooves. There are helical or zig-zag grooves 20 in the CORDOVA et al. device, but herringbone grooves are not disclosed. Herringbone involves a pattern of rows of short, slanted parallel lines, with the direction of the slant alternating row by row. This is not found in CORDOVA et al.'s device.

Nonetheless, it is respectfully submitted that the bearing of independent claim 1 would neither be suggested nor rendered obvious by the prior art utilized by the Examiner. The secondary reference to MORI et al. would not overcome the above-noted deficiencies. The dependent claims further distinguish the instant invention from the prior art. Accordingly, it is respectfully requested that the 35

USC 103 rejections now be reconsidered and withdrawn. Favorable reconsideration and an early Notice of Allowance are earnestly solicited.

Because the additional prior art cited by the Examiner has been included merely to show the state of the prior art and has not been utilized to reject the claims, no further comments concerning these documents are considered necessary at this time.

In the event that any outstanding matters remain in this application, the Examiner is invited to contact the undersigned at (703) 205-8000 in the Washington, D.C. area.

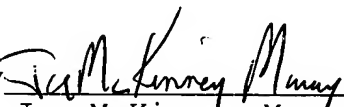
Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), the Applicants respectfully petition for a one (1) month extension of time for filing a response in connection with the present application and the required fee of \$110.00 is attached herewith.

Appl. No. 10/014,471

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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